UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,445	11/19/2003	Sandeep Bhatia	CA7035962001	9844

23639 7590 03/15/2006

BINGHAM, MCCUTCHEN LLP
THREE EMBARCADERO CENTER
18 FLOOR
SAN FRANCISCO, CA 94111-4067

EXAMINER	
TABONE JR, JOHN J	
ART UNIT	**PAPER NUMBER**
2138	

DATE MAILED: 03/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/718,445	BHATIA, SANDEEP	
	Examiner	Art Unit	
	John J. Tabone, Jr.	2138	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-23 have been examined.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 5-7, 8-10, 15-17 and 18-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5, 8, 15 and 18:

The claim limitation "mixed edge triggered scan flip-flops" renders these claims indefinite because it is not clear if this means dual edge triggered scan flip-flops or the first and second scan chains comprise of a mixture of both positive and negative edge triggered scan flip-flops. Clarification and correction is required.

Claims 6-7, 9-10, 16-17, and 19-20:

These claims are also rejected because they depend on Claims 5, 8, 15 and 18, respectively, and have the same problems of indefiniteness.

Claims 7, 10, 17 and 20:

Use of "if" in the claim renders the claim indefinite. The word "if" should be replaced by "when" i.e. "when the [beginning/ending] flip-flop...". Correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1-5, 11-15 and 21-23 are rejected under 35 U.S.C. 102(a) as being anticipated by Masatake (JP-2003-202362), hereinafter Masatake.

Claims 1, 11 and 21:

Masatake teaches scanning a first test data from an input pin (IN1, Drawing 1) into a first scan chain (Shift Register 11, Drawing 1) during a first state of a clock cycle (T3, Drawing 3) and scanning a second test data from the input pin (IN1, Drawing 1) into a second scan chain (Shift Register 12, Drawing 1) during a second state of the clock cycle (T4, Drawing 3). (Abstract, ¶s 37, 38, 47, 49, Drawings 1 and 3).

Claims 2, 12 and 22:

Masatake teaches receiving test data from the first scan chain at an output pin (OUT1, Drawing 1) during the first state of the clock cycle (T3, Drawing 3). (Abstract, ¶s 37, 38, 47, 49, Drawings 1 and 3).

Claims 3, 13 and 23:

Masatake teaches receiving test data from the second scan chain at the output pin (OUT2, Drawing 1) during the second state of the clock cycle (T4, Drawing 3). (Abstract, ¶s 37, 38, 47, 49, Drawings 1 and 3).

Claims 4 and 14:

Masatake teaches sending test data from the first and second scan chains (Shift Register 11 and 12, Drawing 1) to a multiplexor (multiplexer 41, Drawing 1), applying a select signal to the multiplexor based on the state of the clock signal (CLK), and causing the multiplexor to output test data from either the first or second scan chain to the output pin based on the select signal (SCO1, Drawings 1 and 3). (Abstract, ¶s 37, 38, 47, 49, Drawings 1 and 3).

Claims 5 and 15:

Masatake teaches scanning the first test data by using a return-to-one clock waveform (T3, T4, T5, Drawing 3) and **using positive edge triggered scan flip-flops** in the first scan chain (Drawing 2). Masatake also teaches scanning the second test data by using the return-to-one clock waveform (T3, T4, T5, Drawing 3) and **using positive edge triggered scan flip-flops** in the second scan chain (Drawing 2). (Abstract, ¶s 37, 38, 47, 49, Drawings 1-3).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masatake (JP-2003-202362), hereinafter Masatake.

Claims 8 and 18:

These claims are an obvious alternate representation of claims 5 and 15 and, as such, are rejected as per these rejections. To use a return-to-zero selection criteria instead of return-to-one selection criteria is considered an alternate design choice.

5. Claims 6, 9, 16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masatake (JP-2003-202362), hereinafter Masatake, in view of Jaramillo et al., (10 Tips for Successful Scan Design: Part two, February 17, 2000, ednmag.com, pp. 77-90), hereinafter Jaramillo.

Claims 6 and 16:

Masatake does not explicitly teach "**associating a lockup register with a beginning flip-flop or an ending flip-flop of the first or second scan chains based on return-to-one selection criteria**". Jaramillo teaches in an analogous art the general use of using a lockup register with a beginning flip-flop or an ending flip-flop of two separate scan chains. (Fig. 3, page 82). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Masatake's design of Drawing 1 to include Jaramillo's design suggestions of using lockup latches when interfacing positive and negative edge clock scan flip-flops. The artisan would be motivated to do so because it would prevent Masatake's design of Drawing 1 from shifting data through both edged flip-flops in on clock cycle.

Claims 9 and 19:

These claims are an obvious alternate representation of claims 6 and 16 and, as such, are rejected as per these rejections. To use a return-to-zero selection criteria instead of return-to-one selection criteria is considered an alternate design choice.

6. Claims 7, 10, 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masatake (JP-2003-202362), hereinafter Masatake, in view of Jaramillo et al., (10 Tips for Successful Scan Design: Part two, February 17, 2000, ednmag.com, pp. 77-90), hereinafter Jaramillo, in further view of Morton (US 20040078741), hereinafter Morton.

Claims 7 and 17:

Masatake in view of Jaramillo does not explicitly teach "associating a negative edge triggered scan-in lockup register with the beginning flip-flop of the first scan chain if the beginning flip-flop of the first scan chain has a positive edge trigger", "associating a positive edge triggered scan-in lockup register with the beginning flip-flop of the second scan chain if the beginning flip-flop of the second scan chain has a negative edge trigger" and "associating a negative edge triggered scan-out lockup register if the ending flip-flop of the second scan chain has a negative edge trigger". However, Masatake in view of Jaramillo does teaches the general use of using a lockup register with a beginning flip-flop or an ending flip-flop of two separate scan chains to prevent a shoot-through condition. (Fig. 3, page 82). Morton teaches in an analogous art "associating a negative edge triggered scan-in lockup register with the beginning flip-

flop of the first scan chain if the beginning flip-flop of the first scan chain has a positive edge trigger". (Fig. 2, ¶ 21). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify lockup latch configuration of Masatake in view of Jaramillo with Morton's design of Fig. 2. The artisan would be motivated to do so because it would enable the lockup latch configuration of Masatake in view of Jaramillo to present input data IN1 of Drawing 1 to the input of scan chain 11 on the inactive portion of the clock, thus preventing shoot-through. Also, the claim limitations "associating a positive edge triggered scan-in lockup register with the beginning flip-flop of the second scan chain if the beginning flip-flop of the second scan chain has a negative edge trigger" and "associating a negative edge triggered scan-out lockup register if the ending flip-flop of the second scan chain has a negative edge trigger" are obvious design choices given the above mentioned modification to Masatake in view of Jaramillo.

Claims 10 and 20:

These claims are an obvious alternate representation of claims 7 and 17 and, as such, are rejected as per these rejections. To use a *positive edge* triggered scan-in lockup register with a *negative edge* trigger beginning flip-flop of the first scan chain instead of a *negative edge* triggered scan-in lockup register with a *positive edge* trigger beginning flip-flop of the first scan chain is considered an alternate design choice.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Adusumilli (US-6418545)

Adusumilli teaches multiple parallel scan chains being connected to scan output multiplexers for the reduction of scan output pins. (Claims 1-4, 11-14 and 21-23).

b. Sim (US-20030204802)

Sim teaches multiple parallel scan chains being connected to scan output multiplexers for the reduction of scan output pins. (Claims 1-4, 11-14 and 21-23).

c. Hom et al. (US-607904)

Hom teaches multiple parallel scan chains being connected to scan output multiplexers for the reduction of scan output pins. (Claims 1-4, 11-14 and 21-23).

d. Huth et al. (US006901544)

Huth teaches and example of using scan lockup latches in a design with different clock domains. (Claims 5-10 and 15-20).

e. Jaramillo et al., 10 Tips for Successful Scan Design: Part one, February 17, 2000, ednmag.com, pp. 67-75

Jaramillo teaches and example of using scan lockup latches in a design with different clock domains. (Claims 5-10 and 15-20).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John J. Tabone, Jr. whose telephone number is (571) 272-3827. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John J. Tabone, Jr. 2/3/06
Examiner
Art Unit 2138

ALBERT DECADY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100